DECLARATION

I, Young Woo Park, Korean Patent Attorney of 5F, Seil Building, 727-13, Yoksam-dong, Gangnam-gu, Seoul, Korea do hereby solemnly and sincerely declare as follows:

1. That I am well acquainted with the English and Korean languages.

2. That the following is a correct translation into English of the accompanying certified copy of a Korean Patent Application No. 2003-53509.

and I make the solemn declaration conscientiously believing the same to be true.

Seoul, October 31, 2005

Young Woo Park

Young-Woo PARK

THE KOREAN INDUSTRIAL PROPERTY OFFICE

This is to certify that annexed hereto is a true copy from the records of the Korean Industrial Property Office of the following application as filed.

Application Number : Patent Application No. 2003-53509

Date of Application : August 1, 2003

Applicant : Samsung Electronics Co., Ltd.

COMMISSIONER

PATENT APPLICATION

Applicant : Name: Samsung Electronics Co., Ltd.
(Representative: Jong-Yong YUN)

Address : 416 Maetan-dong, Yoengtong-gu, Suwon-city, Kyungki-do, Republic of Korea

Agent(s) : Young-Woo PARK

Inventor(s) : Name : Jeong-Seok OH

: Address : #629-18, Changsin2-dong, Jongro-gu, Seoul, KOREA

Title of the Invention : TWO WAY BACK LIGHT ASSEMBLY AND TWO WAY LIQUID CRYSTAL DISPLAY DEVICE USING THE SAME

Dated this: September 2, 2003

To the COMMISSIONER

[ABSTRACT]

A two-way backlight assembly to control a quantity of light emitted into two directions and a two-way liquid crystal display device having the same are disclosed. The two-way backlight assembly includes a light source, a first light guide plate emitting light incident from the light source toward a first direction, and a second light guide plate emitting light incident from the light source toward a second direction. Thicknesses of the first and the second light guide plates are different from each other according to a ratio of amounts of the light emitted into two directions. Therefore, the rate of amounts of the light emitted into the first and second directions may be easily controlled.

[REPRESENTATIVE FIGURE]

FIG. 2

[INDEX]

two-way backlight assembly, light guide plate, display unit

[SPECIFICATION]

[TITLE OF THE INVENTION]

TWO WAY BACK LIGHT ASSEMBLY AND TWO WAY LIQUID CRYSTAL DISPLAY DEVICE USING THE SAME

[BRIEF EXPLANATION OF THE DRAWINGS]

FIG. 1 is a conceptional view of a backlight assembly according to a first example embodiment of the present invention.

FIG. 2 is an exploded perspective view showing the backlight assembly in FIG. 1.

FIG. 3 is a perspective view showing the light source in FIG. 2.

FIG. 4 is a perspective view showing the second receiving container in FIG. 2.

FIG. 5 is a conceptional view showing a backlight assembly according to a second example embodiment of the present invention.

FIG. 6 is a conceptional view showing a backlight assembly according to a third example embodiment of the present invention.

FIG. 7 is a conceptional view showing a backlight assembly according to a fourth example embodiment of the present invention.

FIG. 8 is an exploded perspective view showing a liquid crystal display device according to an example embodiment of the present invention.

FIG. 9 is a perspective view showing the first display unit shown in FIG. 8.

<EXPLANATION ON CHIEF REFERENCE NUMERALS OF DRAWINGS >

100 : backlight assembly	110 : light source
120 : first light guide plate	130 : second light guide plate
140 : reflecting plate	150 : first optical member
160 : second optical member	210 : first receiving container
220 : second receiving container	230 : third receiving container
810 : first display unit	820 : second display unit

[DETAILED DESCRIPTION OF THE INVENTION]

[PURPOSE OF THE INVENTION]

[THE ART TO WHICH THE INVENTION PERTAINS AND THE PRIOR ART]

The present invention relates to a two-way backlight assembly and a liquid crystal display device having the same, and more particularly a two-way backlight assembly providing light into two directions different form each other to display an informational image in the two directions and a liquid crystal display device having the same.

Generally, a liquid crystal display device may be defined as a device displaying an image by using liquid crystal molecules that change optical transmittance according to an intensity of an electric filed. A liquid crystal display device like this has an advantage that may embody a flat type display device having a thin thickness.

The liquid crystal display device, which has an advantage mentioned

above, have been widely used at a display device of various electronic goods such as cellular phones, portable computers, desktop computers, etc., and it was general that the liquid crystal display device displays an image in single direction.

However, in response to various demands of users, a technology related to a two-way display device displaying the same or different images in two directions has been developed as well as displaying an image in single direction.

Such a two-way display device includes a first display unit for displaying a first image in a first direction, a second display unit for displaying a second image in a second direction opposite to the first direction, and a two-way backlight assembly emitting light in two directions to provide the first and second display units with light.

The two-way backlight assembly includes a light source generating light, a first light guide plate emitting the light provided from the light source into the first direction, a second light guide plate emitting the light provided from the light source into the second direction and having the same thickness as the first light guide plate, and a reflecting plate disposed between the first and the second light guide plates.

The two-way backlight assembly having a structure mentioned above does nothing but emit the light provided from the light source in two directions different form each other, and have never had a function to control the ratio of amounts of the light exiting in the two directions.

However, in a recent two-way liquid crystal display device, a technology

to control the ratio of amounts of the light exiting in the two directions on demand is necessary to be developed, because brightness required of the first and the second display units is different from each other according to respective purposes.

[TECHNICAL OBJECT OF THE INVENTION]

Accordingly, the present invention has been devised to solve the above-mentioned problems, and the present invention provides a two-way backlight assembly to control the ratio of amounts of the light exiting in the two directions.

The present invention also provides a two-way liquid crystal display device to display an informational image in two directions by using the two-way backlight assembly that may control the ratio of amounts of the light exiting in the two directions.

[CONTRUCTION OF THE INVENTION]

The two-way backlight assembly to achieve the above-mentioned purpose of the present invention includes a light source generating a light, a first and second light guide plates changing a path of the light to guide in two directions different from each other, and a reflecting plate reflecting the light.

The first light guide plate includes a first light incident surface receiving the light generated from the light source, and the first light incident surface has a first thickness.

The second light guide plate includes a second light incident surface receiving the light generated from the light source, and the second light incident surface has a second thickness that is different from the first thickness.

The reflecting plate is disposed between the first and the second light guide plates to reflect light leaked from the first and the second light guide plates.

The two-way backlight assembly to achieve another purpose of the present invention includes a light source generating a light, a first and a second light guide plates changing a path of the light to guide in two directions different from each other, and a reflecting plate disposed between the first and the second light guide plates.

The first light guide plate includes a first light incident surface receiving the light generated from the light source, and the first light incident surface has a first thickness. The second light guide plate includes a second light incident surface receiving the light generated from the light source, and the second light incident surface has a second thickness that is different from the first thickness.

In this case, a position of the light source is changed according to a ratio of amounts of the light exiting from the first and the second light guide plates respectively.

A two-way liquid crystal display device to achieve another purpose of the present invention includes a two-way backlight assembly emitting light in a first and a second directions, a first display unit and a second display unit.

The two-way backlight assembly includes a first and a second light guide plates. The first light guide plate has a first thickness, and the second

light guide has a second thickness different from the first thickness.

The first display unit displays an image by using light exiting in the first direction, and the second display unit displays an image by using light exiting in the second direction.

A two-way liquid crystal display device to achieve another purpose of the present invention includes a two-way backlight assembly, a first display unit and a second display unit. The two-way backlight assembly includes a light source whose position is changed according to a ratio of amounts of light exiting.

The two-way backlight assembly includes a light source generating a light, a first light guide plate changing a path of light generated from the light source to emit the light in a first direction, a second light guide plate to emit the light in a second direction different from the first direction, and a reflecting plate disposed between the first and the second light guide plates.

In this case, a position of the light source is changed according to a ratio of amounts of the light exiting from the first and the second light guide plates respectively.

In the two-way backlight assembly and the two-way liquid crystal display device having the same, a first light guide plate emitting light in a first direction and a second light guide plate emitting light in a second direction are formed so that their thicknesses are different from each other, or a light source is formed so that its position may be changed. Therefore, it is possible to control the ratio of amounts of light exiting in a first and a second directions.

Hereinafter, the present invention will become more apparent by

describing in detail example embodiments thereof with reference to the accompanying drawings.

FIG. 1 is a conceptional view of a backlight assembly according to a first example embodiment of the present invention.

Referring to FIG. 1, the two-way backlight assembly 100 includes a light source 110, a first light guide plate 120, a second light guide plate 130, and a reflecting plate 140.

Concretely, the light source 110 is disposed adjacent to the first and the second light guide plates 120 and 130 to generate a light. The light source 110 includes a fluorescent lamp or a light emitting diode. Preferably, the light source 110 includes a light emitting diode. The light source 110 generates the light to supply the light to the first and the second light guide plates 120 and 130.

The first light guide plate 120 includes four sidewalls including a first light incident surface 122, a first light exiting surface 124 emitting the light incident into the first light guide plate 120 in a first direction A, and a first reflecting surface 126 facing each of the first light exiting surface 124. The first light incident surface 122 has a first thickness C.

The second light guide plate 130 is disposed facing each of the first reflecting surface 126 of the first light guide plates 120. The second light guide plates includes four sidewalls including a second light incident surface 132, a second light exiting surface 134 emitting the light incident into the second light guide plate 130 in a second direction B opposite to the first direction A, and a second reflecting surface 136 facing each of the second light exiting surface 134. The second light incident surface 132 has a second

thickness D smaller than the first thickness C.

The reflecting plate 140 is disposed between the first and the second light guide plates 120 and 130 to reflect light leaked from the first and the second light guide plates 120 and 130. Concretely, the reflecting plate 140 is disposed between the first reflecting surface 126 and the second reflecting surface 136 of the second light guide plate 130. The reflecting plate 140 reflects portions of the lights incident into the first and the second light incident surfaces 122 and 132 leaked from the first and the second reflecting surfaces 126 and 136 into the first and the second light exiting surfaces 124 and 134.

The two-way backlight assembly 100 includes a first optical member 150 disposed on the first light exiting surface 124 of the first light guide plate 120, and a second optical member 170 disposed on the second light exiting surface 134 of the second light guide plate 130.

The first optical member 150 comprises a diffusion sheet diffusing the light and at least one prism sheet condensing the light. The first optical member 150 improves brightness and viewing angle of the light exiting in a first direction A. The second optical member 160 comprises a diffusion sheet diffusing the light and at least one prism sheet condensing the light. The second optical member 160 improves brightness and viewing angle of the light exiting in a second direction B.

In the two-way backlight assembly 100 according to the first example embodiment of the present invention, the first thickness C of the first light guide plate 120 is larger than the second thickness D of the second light guide plate 130. A thickness of the light source 110 is substantially the same as a third

thickness E that is a sum of the first thickness C and the second thickness D. Therefore, the first light guide plate 120 receives more light than the second light guide plate 130 from the light source 110, and the light exits more in the first direction A than in the second direction B.

Besides, the second light guide plate 130 may have substantially the same size as the first light guide plate 120. The size of the second light guide plate 130 may be changed according to the use of a product. In this example embodiment, the size of the second light guide plate 130 is smaller than that of the first light guide plate 120, and the second light guide plate 130 is disposed parallel with the first light guide plate 120.

FIG. 2 is an exploded perspective view showing the backlight assembly in FIG. 1.

Referring to FIG. 2, the two-way backlight assembly 100 includes a first receiving container 210 securing the light source 110 with the first light guide plate 120, a second receiving container 220 secured with the first receiving container 210 to receive the light source 110 and the first light guide plate 120, and a third receiving container 230 securing the second light guide plate 130.

Concretely, the first and the second receiving containers 210 and 220 are secured to form a receiving space. The reflecting plate 140, the first light guide plate 120 and the first optical member 150 are disposed in the receiving space.

An opening 224 is formed in the second receiving container 220 corresponding to the second light guide plate 130, and the third receiving container 230 is secured with the second receiving container 220

corresponding to the opening 224. The second light guide plate 130 and the second optical member 160 are disposed in the receiving space formed by securing the second and third receiving containers 220 and 230.

Besides, the light source 110 is disposed on a portion of the first receiving container 210 to supply light to the first and the second light guide plates 120 and 130.

FIG. 3 is a perspective view showing the light source in FIG. 2.

Referring to FIG. 3, the light source 110 includes a plurality of light emitting diodes, and the light emitting diodes 110 are collocated on a flexible printed circuit (FPC) 112.

The flexible printed circuit 112 includes a base substrate 114 and a conducting wire 116 formed on the base substrate 114. The light emitting diodes are disposed on the base substrate 114, serially. The conducting wire 116 includes two conducting lines serially connected to the light emitting diodes 110 to supply a lamp driving voltage externally provided thereto to the light emitting diodes 110.

The light emitting diodes 110 are disposed on the flexible printed circuit 112, and the flexible printed circuit 112 is disposed on a portion of the first receiving container 210.

FIG. 4 is a perspective view showing the second receiving container in FIG. 2.

Referring to FIG. 4, the second receiving container 220 includes a first to fourth sidewalls 224a to 224d and a bottom surface 222. The second receiving container 220 is secured with the first receiving container 210 by

hooks 227 formed on the first to fourth sidewalls 226a to 226d.

The opening 224 is formed in the bottom surface 222 corresponding to the second light guide plate 130. The second light guide plate 130 is disposed in the opening 224. A receiving recess 228 receiving the light source 110 is disposed between the first sidewall 226a and the opening 224. The receiving recess 228 is protruded outwardly from the bottom surface 222, and a thickness F of the receiving recess 228 is substantially equal to the second thickness D of the second light guide plate 130.

The first thickness C of the first light guide plate 120 of the two-way backlight assembly 100 is larger than the second thickness D of the second light guide plate 130 so that the amount of the light emitting in the first direction A is larger than the amount of the light emitting in the second direction B.

FIG. 5 is a conceptional view showing a backlight assembly according to a second example embodiment of the present invention. Because elements except a first light guide plate and a second light guide plate are substantially the same as the first example embodiment, the same reference number will be used, and a repeated explanation will be omitted as necessary.

Referring to FIG. 5, a backlight assembly 300 includes light source 110 generating light, a first and second light guide plates 310 and 320 guiding the light and a reflecting plate 140.

Concretely, the light source 110 is disposed on a portion of the first and the second light guide plates 310 and 320 to supply the light to the first and the second light guide plates 310 and 320.

The first light guide plate 310 includes four sidewalls including a first

light incident surface 312, a first light exiting surface 314 emitting the light incident into the first light guide plate 310 in a first direction A, and a first reflecting surface 316 facing each of the first light exiting surface 314. The first light incident surface 312 has a first thickness C.

The second light guide plate 320 is disposed facing each of the first reflecting surface 316 of the first light guide plates 310. The second light guide plates includes four sidewalls including a second light incident surface 322, a second light exiting surface 324 emitting the light incident into the second light guide plate 320 in a second direction B opposite to the first direction A, and a second reflecting surface 326 facing each of the second light exiting surface 324. The second light incident surface 322 has a second thickness D larger than the first thickness C.

The reflecting plate 140 is disposed between the first and the second light guide plates 310 and 320 to reflect light leaked from the first and the second light guide plates 310 and 320.

Besides, the two-way backlight assembly 300 further includes a first optical member 150 disposed on the first light exiting surface 314 of the first light guide plate 310 to improve brightness and viewing angle of the light exiting in a first direction A, and a second optical member 160 disposed on the second light exiting surface 314 of the second light guide plate 310 to improve brightness and viewing angle of the light exiting in a second direction B.

In the two-way backlight assembly 300 according to the second example embodiment of the present invention, the first thickness C of the first light guide plate 310 is smaller than the second thickness D of the second light

guide plate 320. A thickness of the light source 110 is substantially the same as a third thickness E that is a sum of the first thickness C and the second thickness D. Therefore, the second light guide plate 320 receives more light than the first light guide plate 310 from the light source 110, and the light exits more in the second direction B than in the first direction A.

Like this, in the two-way backlight assemblies according to the first and the second example embodiments of the present invention, the first and the second light guide plates are configured so that their thicknesses are different from each other, thereby controlling the ratio of amounts of the light exiting in the two directions.

Besides, in case thicknesses of the first and the second light guide plates of the two-way backlight assembly are the same, a position of the light source may be changed so as to control the ratio of amounts of the light exiting in the two directions.

FIG. 6 is a conceptional view showing a backlight assembly according to a third example embodiment of the present invention.

Referring to FIG. 6, a two-way backlight assembly 400 includes a light source 110 generating light, a first light guide plate 410, a second light guide plate 420 guiding the light and a reflecting plate 140.

The first light guide plate 410 includes four sidewalls including a first light incident surface 412, a first light exiting surface 414 emitting the light incident into the first light guide plate 410 in a first direction A, and a first reflecting surface 416 facing each of the first light exiting surface 414. The first light incident surface 412 has a first thickness C.

The second light guide plate 420 is disposed facing each of the first reflecting surface 416 of the first light guide plates 410. The second light guide plates includes four sidewalls including a second light incident surface 422, a second light exiting surface 424 emitting the light incident into the second light guide plate 420 in a second direction B opposite to the first direction A, and a second reflecting surface 426 facing each of the second light exiting surface 424. The second light incident surface 422 has a second thickness D that is the same as the first thickness C.

The reflecting plate 140 is disposed between the first and the second light guide plates 410 and 420 to reflect light leaked from the first and the second light guide plates 410 and 420.

In this case, the light source 110 has a third thickness E that is substantially the same as a sum of the first thickness C and the second thickness D. The light source 110 is disposed so as to cover a whole of the first light incident surface 412 and a portion of the second light incident surface 422.

Besides, the two-way backlight assembly 400 further includes a first optical member 150 disposed on the first light exiting surface 414 of the first light guide plate 410 to improve brightness and viewing angle of the light exiting in a first direction A, and a second optical member 160 disposed on the second light exiting surface 414 of the second light guide plate 410 to improve brightness and viewing angle of the light exiting in a second direction B.

In the two-way backlight assembly 400 according to the third example embodiment of the present invention, the first light guide plate 410 receives

more light than the second light guide plate 420 from the light source 110, and the light exits more in the first direction A than in the second direction B.

FIG. 7 is a conceptional view showing a backlight assembly according to a fourth example embodiment of the present invention. Because elements except a position of a light source are substantially the same as the third example embodiment, the same reference number will be used, and a repeated explanation will be omitted as necessary.

Referring to FIG. 7, a two-way backlight assembly 500 includes a light source 110 generating light, a first light guide plate 410, a second light guide plate 420 guiding the light and a reflecting plate 140..

In this case, the light source 110 has a third thickness E that is substantially the same as a sum of the first thickness C and the second thickness D. The light source 110 is disposed so as to cover a portion of the first light incident surface 412 and a whole of the second light incident surface 422.

In the two-way backlight assembly 500 according to the fourth example embodiment of the present invention, the second light guide plate 420 receives more light than the first light guide plate 410 from the light source 110, and the light exits more in the second direction B than in the first direction A.

Like this, in the two-way backlight assemblies according to the third and the fourth example embodiments of the present invention, the ratio of amounts of the light exiting in the two directions may be controlled just by changing the position of the light source.

Besides, two display units are combined with the two-way backlight

assembly according to from the first to the fourth example embodiments of the present invention to configure a two-way liquid crystal display device. Hereinafter, a repeated explanation will be omitted as necessary, because an explanation of the two-way backlight assembly, which is an element of the two-way liquid crystal display device, has been given above in detail. Also, the same terms and reference numbers will be used.

FIG. 8 is an exploded perspective view showing a liquid crystal display device according to an example embodiment of the present invention, and FIG. 9 is a perspective view showing the first display unit shown in FIG. 8.

Referring to FIG. 8 and FIG. 9, the liquid crystal display device 800 includes a first display unit 810, a second display unit 820 and the two-way backlight assembly 100 shown in FIG. 1.

The first display unit 810 is disposed in the first receiving container 210, and the first display unit 810 displays an image by means of light exiting from the first light exiting surface 124 of the first light guide plate 120 through the first optical member 150 in the first direction A.

The first display unit 810 includes a liquid crystal display panel 814, a driving chip 816 and a flexible printed circuit 818.

The liquid crystal display panel 814 includes a first substrate 811, a second substrate 812 corresponding to the first substrate 811 and a liquid crystal layer (not shown) disposed between the first and the second substrates 811 and 812.

A plurality of pixels (not shown) are arranged on the first substrate 811 as a matrix shape, and each of the pixels (not shown) includes a gate line (not

shown) extended in a first line direction and a data line (not shown) extended in a second line direction to be overlapped with the gate line. The gate line (not shown) is insulated from the data line (not shown). A thin film transistor (TFT) (not shown) is formed on each of the pixels, and the TFT is connected to the gate and data lines.

The driving chip 816 emitting a driving signal to the data and gate lines is formed on a portion of the first substrate 811. The driving chip 816 may include a chip for the data line and another chip for the gate line. The driving chip 816 may also include a chip for the data and gate lines. The driving chip 816 is formed on the first substrate 811 by a process of chip on glass (COG).

The flexible printed circuit 818 emitting a control signal, which controls the driving chip 816, is formed on a portion of the first substrate 811 having the driving chip 816. The flexible printed circuit 818 includes a timing controller controlling a timing of a driving signal and a memory storing a data signal. The flexible printed circuit 818 is electrically connected to the first substrate 811 having an anisotropic conductive film.

The second display unit 820 is disposed in the third receiving container 230, and the second display unit 820 displays an image by means of light exiting from the second light exiting surface 134 of the second light guide plate 130 so that the light passes through the second optical member 160 in the second direction B. Because the second display unit 820 includes substantially the same elements as the first display unit 810, a repeated explanation will be omitted.

Besides, a displaying area of the first display unit 810 may be

substantially the same as that of the second display unit 820, or the displaying area of the first display unit 810 may be different from that of the second display unit 820 shown in FIG. 8.

In a preferable example embodiment of the present invention, the displaying area of the first display unit 810 is larger than that of the second display unit 820.

The two-way liquid crystal display device 800 further includes a first chassis 830 preventing the first display unit 810 from being separated from the two-way backlight assembly 100 and a second chassis 840 preventing the second display unit 820 from being separated from the two-way backlight assembly 100.

Although the two-way liquid crystal display device 800 includes the two-way backlight assembly 100 shown in FIG. 1 in this example embodiment, the two-way liquid crystal display device 800 may include the two-way backlight assemblies 300, 400 and 500 according to the above-mentioned second or the third example embodiment.

Besides, in a two-way liquid crystal display device including the two-way backlight assembly 400 and 500 according to the third and fourth example embodiment, a position of the light source 110 is changed in accordance with a required brightness ratio of the first and the second display units 810 and 820.

For example, when a mobile communication terminal such as a dual cellular phone includes the two-way liquid crystal display device, brightness of the first and the second display units 810 and 820 may be different from each other. When the cellular phone is not used, the second display unit 820 is

exposed externally so that the brightness of the second display unit 820 is larger than the brightness of the first display unit 810. However, when the folder of the cellular phone is open so that the cellular phone is used, the first display unit 810 is exposed externally so that the brightness of the first display unit 810 is larger than the brightness of the second display unit 820.

Therefore, when the cellular phone is not used, the light source 110 is moved adjacent to the second light guide plate 130. However, when the folder of the cellular phone is open so that the cellular phone is used, the light source 110 is moved adjacent to the first light guide plate 120.

The light source 110 is moved by means of a hinge part (not shown) connected to the folder. An end portion of the hinge part (not shown) is connected to the flexible printed circuit 112 securing the light source 110 so that the position of the light source 110 is changed by means of a rotation of the hinge part (not shown).

[EFFECT OF THE INVENTION]

According to the present invention, the first and the second light guide plates are configured so that their thicknesses are different from each other, thereby controlling the ratio of amounts of the light exiting in the two directions.

Besides, in case thicknesses of the first and the second light guide plates of the two-way backlight assembly are the same, a position of the light source may be changed so as to control the ratio of amounts of the light exiting in the two directions.

Having described the example embodiments of the present invention

and its advantages, it is noted that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by appended claims.

5

[CLAIMS]

[CLAIM 1]

A two-way backlight assembly comprising:

a light source generating a light;

a first light guide plate including a first light incident surface into which the light generated from the light source is incident, the first light incident surface having a first thickness;

a second light guide plate including a second light incident surface into which the light generated from the light source is incident, the second light incident surface having a second thickness; and

a reflecting plate disposed between the first and the second light guide plates.

[CLAIM 2]

The two-way backlight assembly of claim 1, wherein the first thickness is larger than the second thickness.

[CLAIM 3]

The two-way backlight assembly of claim 1, wherein the first thickness is smaller than the second thickness.

[CLAIM 4]

The two-way backlight assembly of claim 1, wherein a thickness of the light source is the same as a third thickness that is a sum of the first thickness and the second thickness.

[CLAIM 5]

The two-way backlight assembly of claim 1, wherein the light source is at least one light emitting diode disposed correspondingly to the first light incident surface and the second light incident surface.

[CLAIM 6]

The two-way backlight assembly of claim 1, wherein the first light guide plate includes:

four sidewalls including the first light incident surface;

a first light exiting surface emitting the light incident into the first light guide plate toward a first direction; and

a first reflecting surface facing each of the first light exiting surface.

[CLAIM 7]

The two-way backlight assembly of claim 6, wherein the second light guide plate includes:

four sidewalls including the second light incident surface;

a second light exiting surface emitting the light incident into the second light guide plate toward a second direction opposite to the first direction; and

a second reflecting surface facing each of the second light exiting surface.

[CLAIM 8]

The two-way backlight assembly of claim 7, wherein the reflecting plate is disposed between the first reflecting surface and the second reflecting surface.

[CLAIM 9]

The two-way backlight assembly of claim 7 further comprising:

a first optical member disposed on the first light exiting surface to improve a characteristic of brightness of the light exiting in the first direction; and

a second optical member disposed on the second light exiting surface to improve a characteristic of brightness of the light exiting in the second direction.

[CLAIM 10]

The two-way backlight assembly of claim 9 further comprising:

a first receiving container securing the light source with the first light guide plate;

a second receiving container combined with the first receiving container to receive the light source and the first light guide plate, and having an opening corresponding to a position of the second light guide plate; and

a third receiving container combined with the opening to secure the second light guide plate and the second optical member.

[CLAIM 11]

A two-way backlight assembly comprising:

a light source generating a light;

a first light guide plate including a first light incident surface into which the light generated from the light source is incident, the first light incident surface having a first thickness;

a second light guide plate including a second light incident surface into which the light generated from the light source is incident, the second light incident surface having a second thickness; and

a reflecting plate disposed between the first and the second light guide plates,

wherein a position of the light source is changed according to a ratio of light exiting from the first light guide plate and the second light guide plate.

[CLAIM 12]

The two-way backlight assembly of claim 11, wherein the first thickness is the same as the second thickness.

[CLAIM 13]

The two-way backlight assembly of claim 11, wherein the light source is at least one light emitting diode.

[CLAIM 14]

The two-way backlight assembly of claim 11, wherein the light source is disposed correspondingly to a whole of the first incident surface and a portion of the second incident surface, thereby providing the first light guide plate with the more light.

[CLAIM 15]

The two-way backlight assembly of claim 11, wherein the light source is disposed correspondingly to a portion of the first incident surface and a whole of the second incident surface, thereby providing the second light guide plate with the more light.

[CLAIM 16]

The two-way backlight assembly of claim 11, wherein the first light guide plate includes four sidewalls including the first light incident surface, a first light

exiting surface emitting the light incident into the first light guide plate toward a first direction, and a first reflecting surface facing each of the first light exiting surface;

wherein the second light guide plate includes four sidewalls including the second light incident surface, a second light exiting surface emitting the light incident into the second light guide plate toward a second direction opposite to the first direction, and a second reflecting surface facing each of the second light exiting surface.

[CLAIM 17]

The two-way backlight assembly of claim 16 further comprising:

a first optical member disposed on the first light exiting surface to improve a characteristic of brightness of the light exiting in the first direction; and

a second optical member disposed on the second light exiting surface to improve a characteristic of brightness of the light exiting in the second direction.

[CLAIM 18]

A two-way liquid crystal display device comprising:

a backlight assembly including:

a light source generating a light;

a first light guide plate including a first light incident surface into which the light generated from the light source is incident, the first light incident surface having a first thickness;

a second light guide plate including a second light incident surface into which the light generated from the light source is incident,

the second light incident surface having a second thickness; and

a reflecting plate disposed between the first and the second light guide plates;

a first display unit displaying an image by using the light exiting in the first direction; and

a second display unit displaying an image by using the light exiting in the second direction.

[CLAIM 19]

The two-way liquid crystal display device of claim 18, wherein the first thickness of the first light guide plate is larger than the second thickness of the second light guide plate.

[CLAIM 20]

The two-way liquid crystal display device of claim 18, wherein the first thickness of the first light guide plate is smaller than the second thickness of the second light guide plate.

[CLAIM 21]

The two-way liquid crystal display device of claim 18, wherein the backlight assembly further comprise:

a first optical member disposed between the first light guide plate and the first display unit to improve a characteristic of brightness of the light exiting in the first direction; and

a second optical member disposed between the second light guide plate and the second display unit to improve a characteristic of brightness of the light

exiting in the second direction.

[CLAIM 22]

The two-way liquid crystal display device of claim 21, wherein the backlight assembly further comprise:

a first receiving container guiding positions at which the light source and the light guide plate are received, and receiving the first display unit;

a second receiving container combined with the first receiving container to receive the light source and the first light guide plate, and having an opening corresponding to a position of the second light guide plate; and

a third receiving container combined with the second receiving container correspondingly to the opening, and receiving the second display unit.

[CLAIM 23]

A two-way liquid crystal display device comprising:

a backlight assembly including:

a light source generating a light;

a first light guide plate including a first light incident surface into which the light generated from the light source is incident, the first light incident surface having a first thickness;

a second light guide plate including a second light incident surface into which the light generated from the light source is incident, the second light incident surface having a second thickness; and

a reflecting plate disposed between the first and the second light guide plates;

a first display unit displaying an image by using the light exiting in the

first direction; and

a second display unit displaying an image by using the light exiting in the second direction,

wherein a position of the light source is changed according to a ratio of light exiting from the first light guide plate and the second light guide plate.

[CLAIM 24]

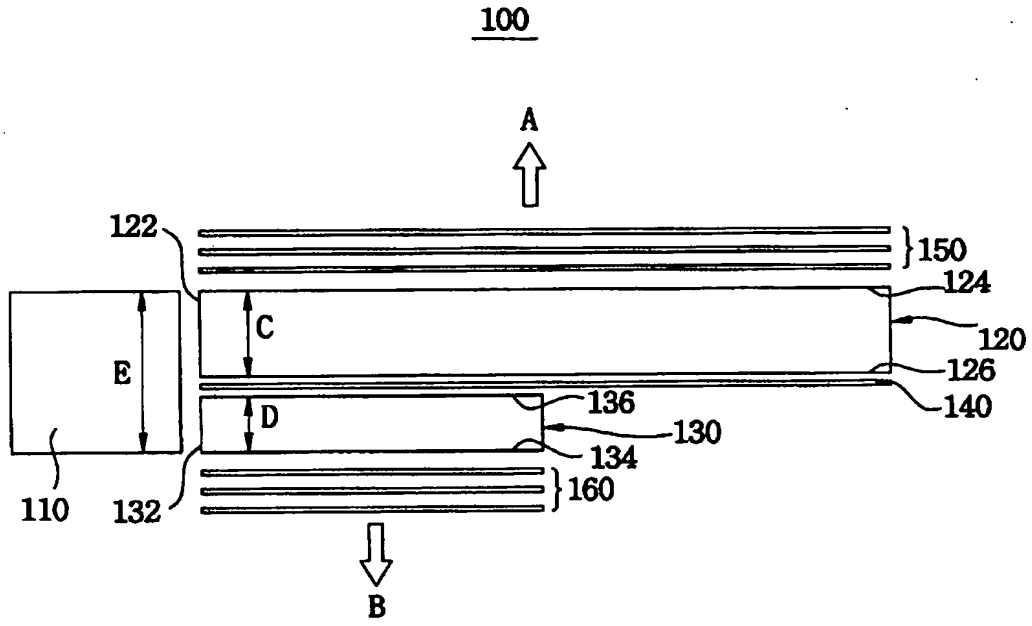
The two-way liquid crystal display device of claim 23, wherein the light source is disposed correspondingly to a whole of the first incident surface and a portion of the second incident surface, thereby providing the first light guide plate with the more light.

[CLAIM 25]

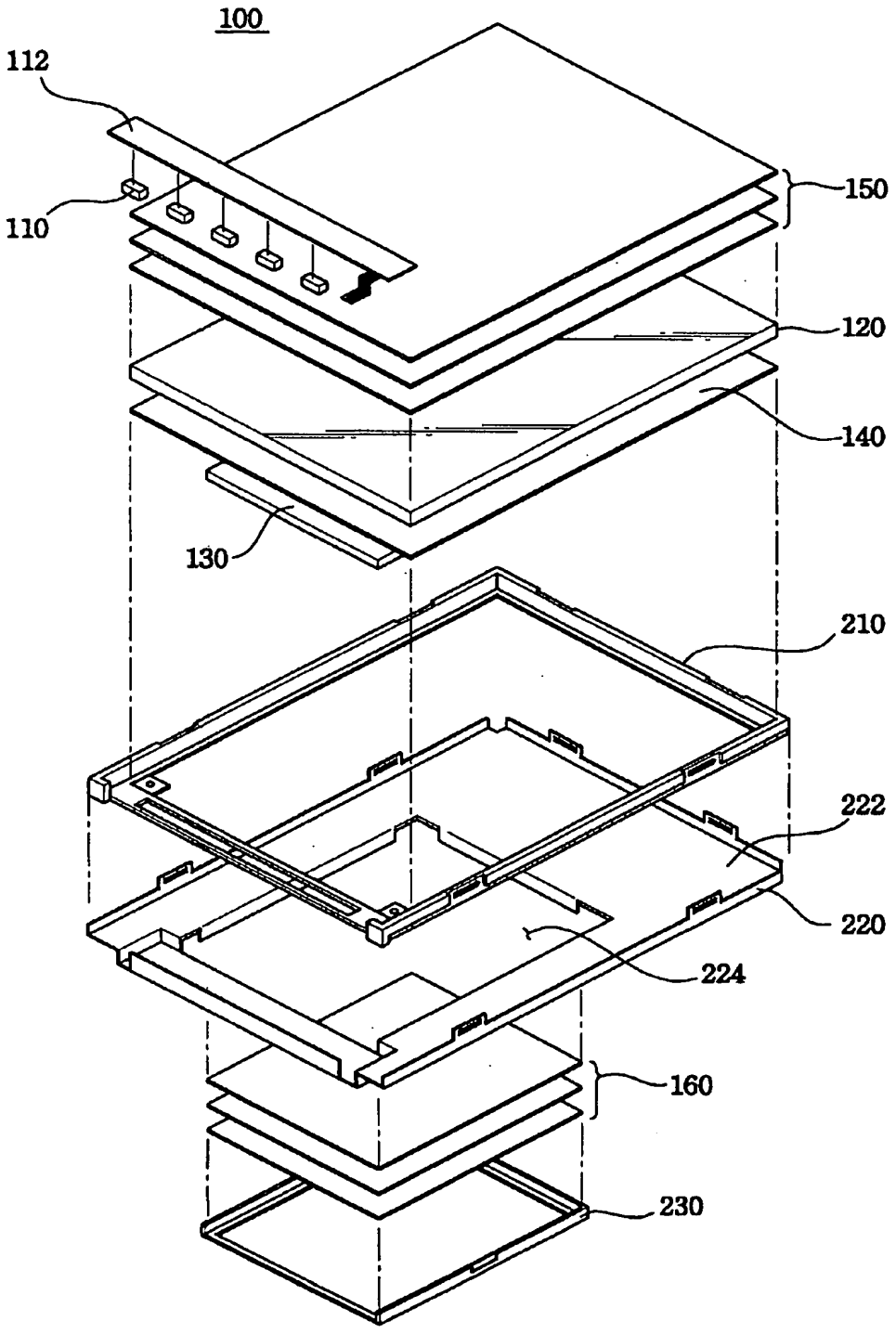
The two-way liquid crystal display device of claim 23, wherein the light source is disposed correspondingly to a portion of the first incident surface and a whole of the second incident surface, thereby providing the second light guide plate with the more light.

[DRAWING]

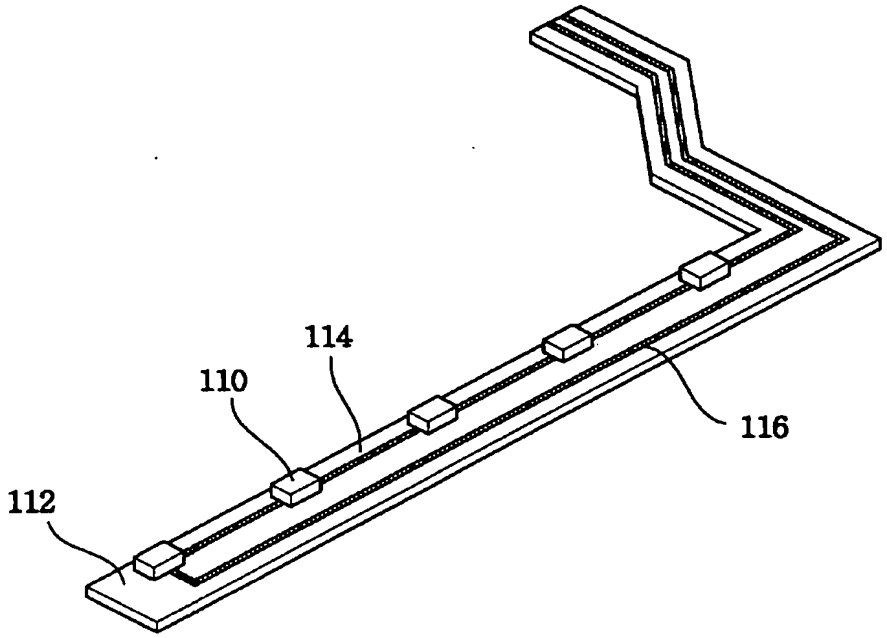
[FIG. 1]



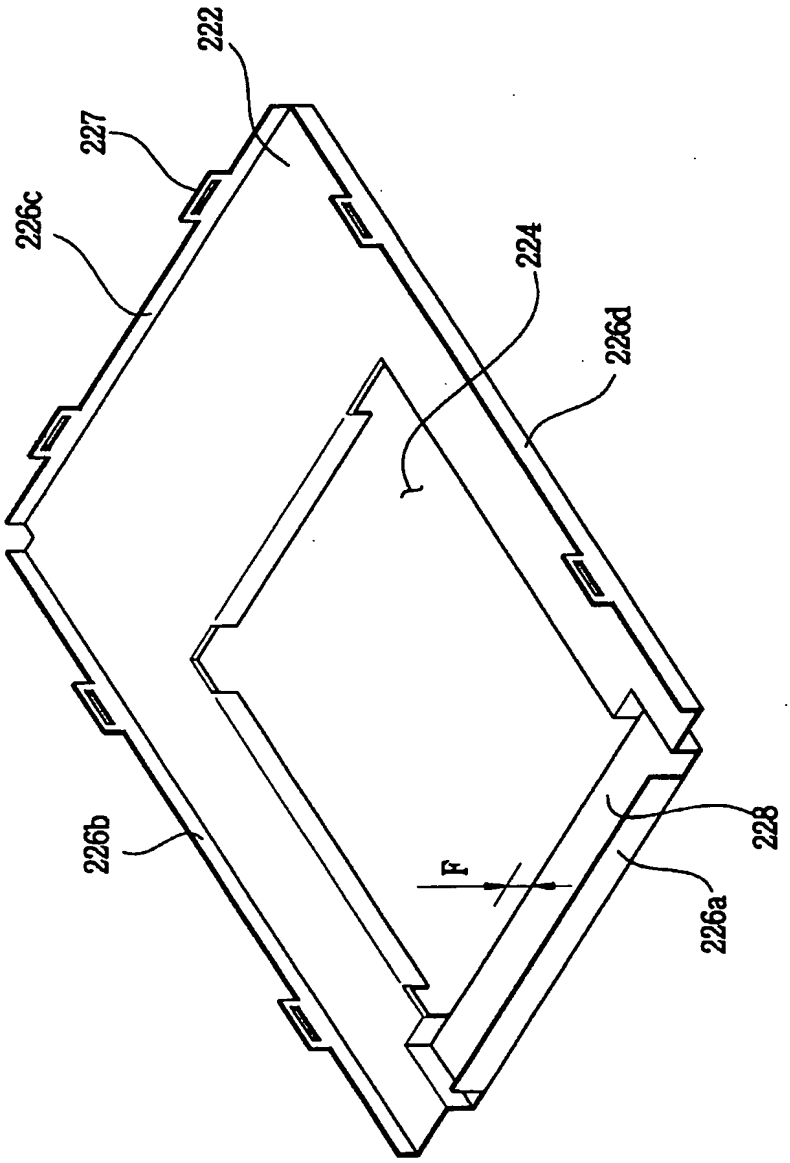
[FIG. 2]



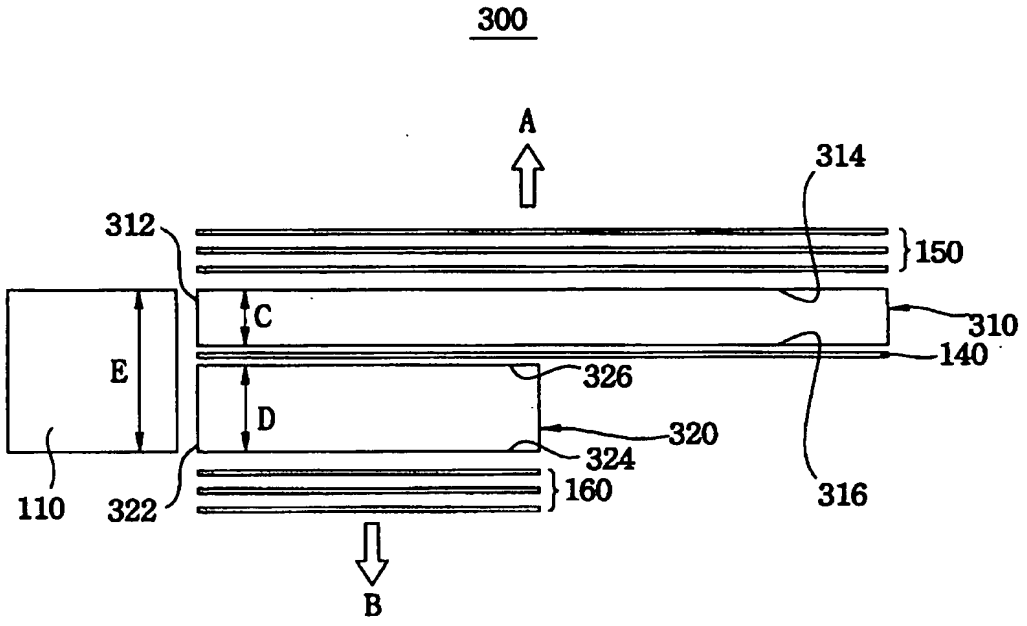
[FIG. 3]



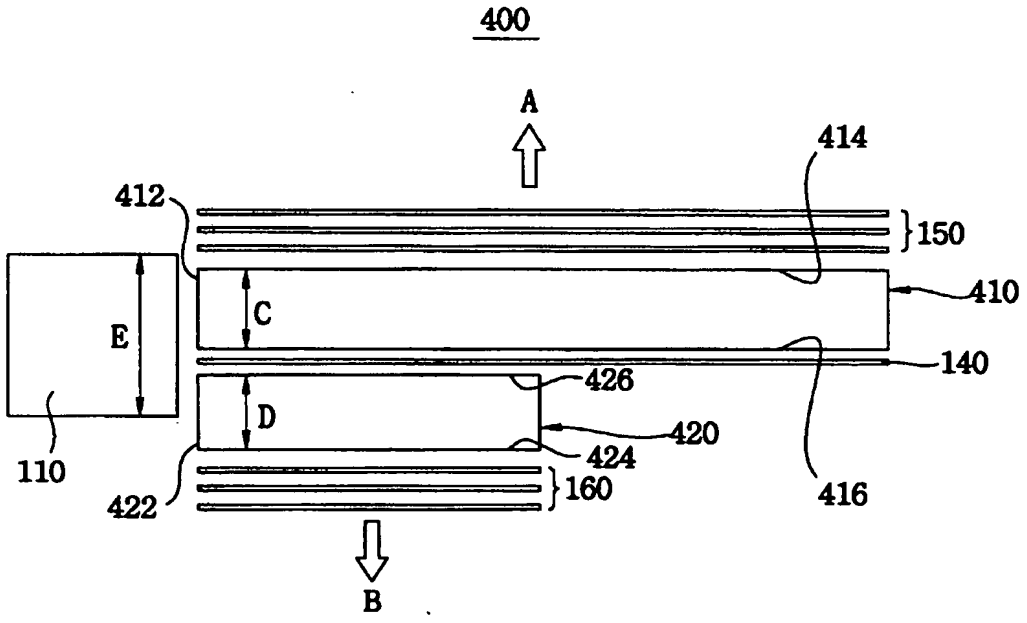
[FIG. 4]



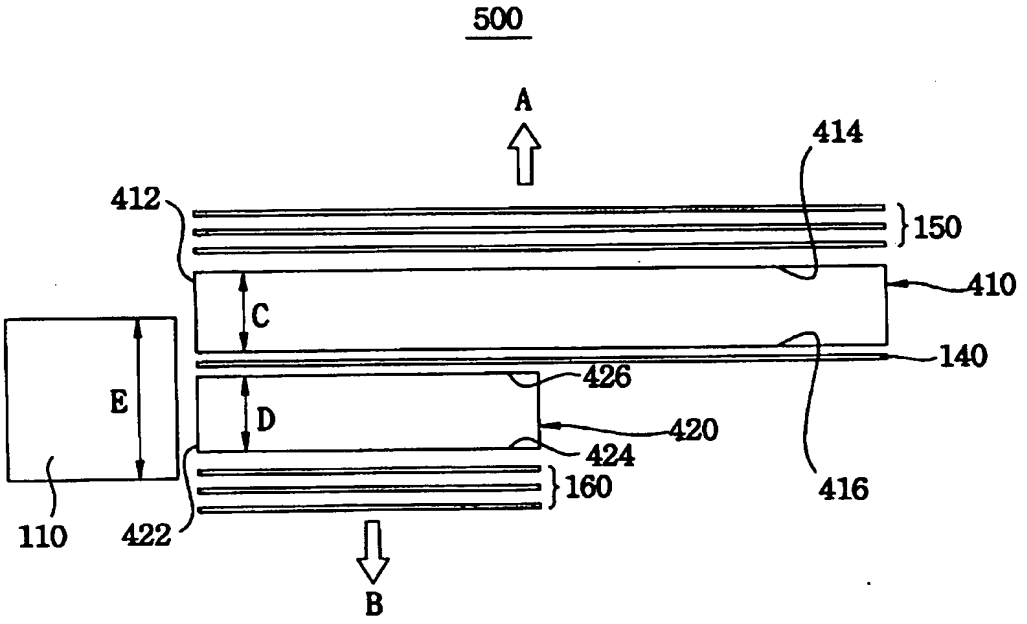
[FIG. 5]


300
A
314
312
150
C
310
E
140
326
D
320
324
110
322
160
316
B

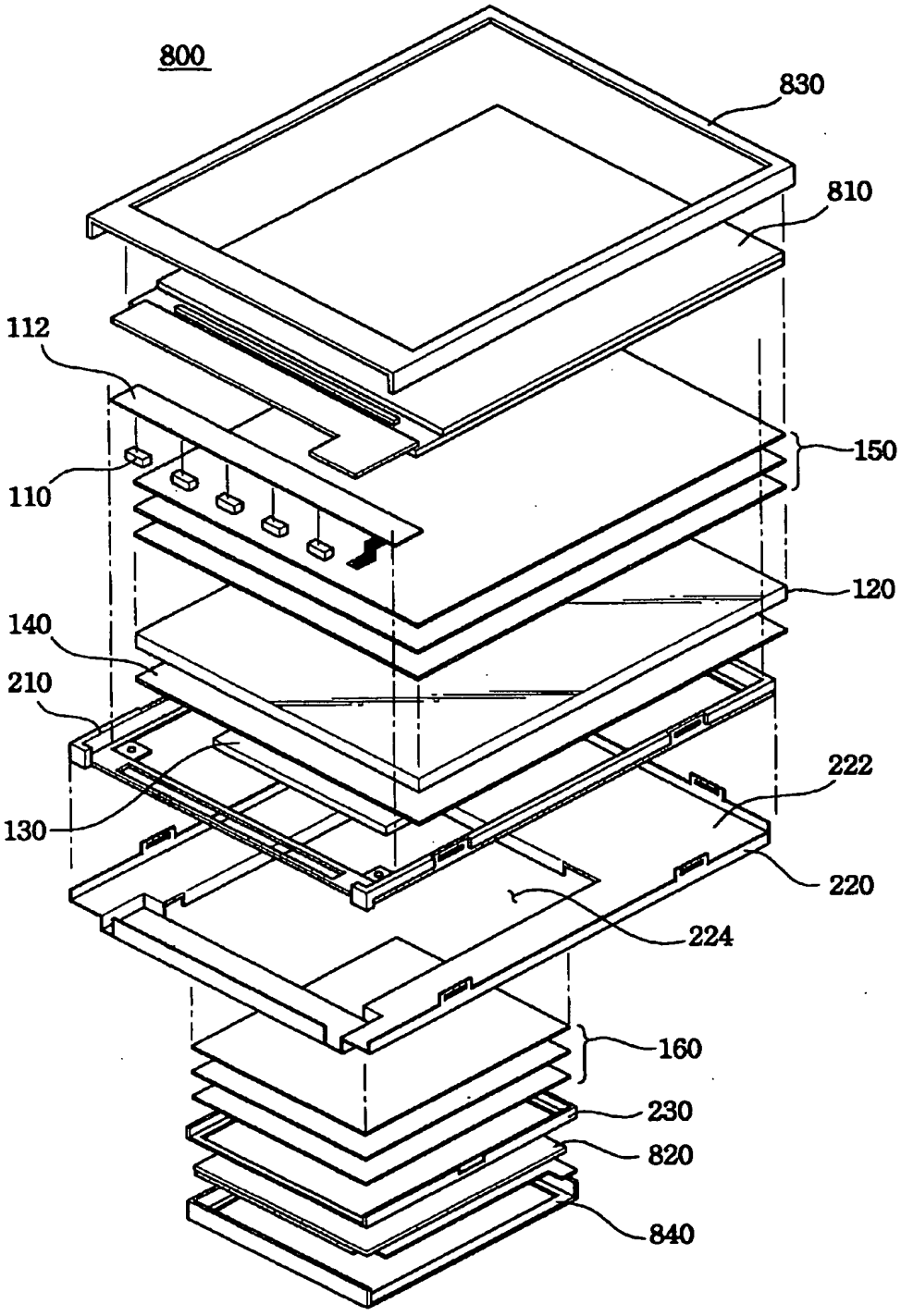
[FIG. 6]


400
A
414
412
150
C
410
E
140
426
D
420
424
110
422
160
416
B

[FIG. 7]



[FIG. 8]


800
830
810
112
150
110
120
140
210
222
130
220
224
160
230
820
840

[FIG. 9]